

# TOUCH SCREEN POTENTIALS FOR EVALUATION OF COGNITIVE ABILITIES

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## INTRODUCTION

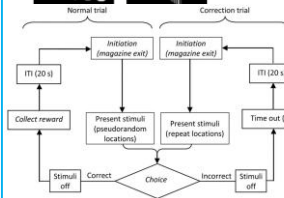
The touch screen system constitutes an increasingly popular method of assessing cognitive functions in rodents. This system has a high translational potential considering its similarity to Cambridge Neuropsychological Test Automated Battery. It has also the advantage to be low stress while using appetitive motivation and requires minimal experimenter involvement. Different protocols can be used for evaluation of various neuropsychological constructs, altered in several psychiatric and neurodegenerative diseases. In the present study, we established two cognition evaluating protocols and analyzed the performance of C57BL/6J and C57BL/6N strains, known to show genetic variation and different behavioral traits.

## PD (pairwise visual discrimination) task



Animals are trained to discriminate between a CS+ and CS- stimuli (images randomized across mice).

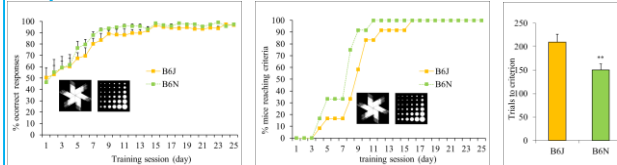
Discrimination learning requires at least two processes: to perceptually discriminate the stimuli, and which of the two stimuli is associated with reward.



5 sessions / week; each session (60 min or 30 trials whichever comes first).

The acquisition criterion: completion of all 30 trials with an accuracy of  $\geq 85$  for two consecutive sessions.

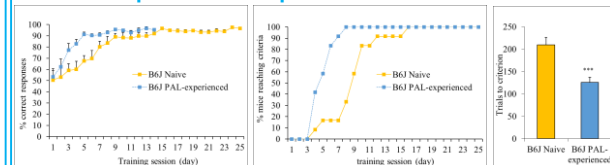
## PD performance in C57BL/6N and C57BL/6J male mice



**Both strains performed above 85% of correct responses after 10 days of training**

**B6N mice reached the learning criterion earlier than B6J counterparts, requiring lower number of trials**

## Effect of experience : PD performance in B6J mice



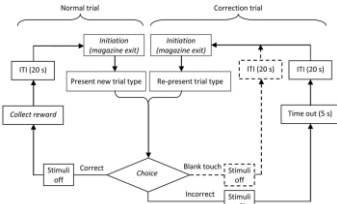
**Experienced B6J mice showed higher PD (but not PAL) performance than naive counterparts, showing higher % of correct responses and reaching learning criteria earlier with lower number of trials**

## Object-Location Paired-Associates Learning (PAL)

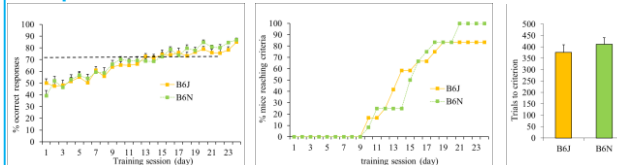
The PAL requires the subject to form an association between a visual stimulus and its location on a screen (e.g. the flower is rewarded only when presented in the left side)

5 sessions / week; each session finishes (60 min or 36 trials whichever comes first).

The acquisition criterion: completion of all 36 trials with an accuracy of  $\geq 70$  for two/three consecutive sessions.

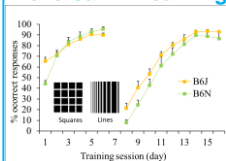


## PAL performance in B6N and B6J male mice



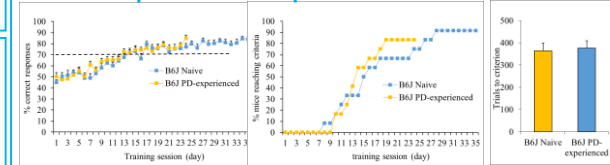
**B6N and B6J males displayed comparable time-dependent PAL learning performance**  
The number of trials to reach 70% correct responses was comparable between strains

## Reversal PD learning



**Experienced B6J males showed higher start PD performance than B6N counterparts with new images as CSs.**  
When the CS+ and CS- were reversed, B6J mice still displayed better start learning performance than B6N mice, suggesting better flexibility in B6J strain

## Effect of experience : PAL performance in B6J mice



**Experienced B6J mice showed higher PD (but not PAL) performance than naive counterparts, showing higher % of correct responses and reaching learning criteria earlier with lower number of trials**

## CONCLUSION

**B6N males showed better learning abilities in the PD than B6J counterparts, but not in the PAL.**

**Experienced B6J males showed better learning abilities than naive counterparts in the PD task, but not in PAL.**

**B6J displayed better flexibility than B6N strain**

